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Chronic Copper Poisoning in a Young Heifer

BY

J. R. TODD and J. F. GRACEY
The Farm, Stormont, Belfast

SUMMARY.—A case of chronic copper poisoning in a 9-month-old heifer is recorded in which death was preceded by marked icterus and haemoglobinuria.

Post-mortem *examination revealed a generalised jaundice, the liver on section being bright yellow in colour, and containing* 1,600 *p.p.m. of copper on the dry weight basis.*

The source was a pig meal containing 250 *p.p.m. of copper which the animal had been receiving at the rate of* 4 *lb. daily for the previous* 5 *months.*

UNTIL recently cattle have been considered to be virtually immune to chronic copper poisoning because attempts to reproduce the condition have been mostly unsuccessful. Sheep are much more susceptible and outbreaks of this type of poisoning are relatively common, recent outbreaks in the British Isles having been reported by Ogilvie (1954), Clegg (1956), and Pearson (1956). The circumstances leading to poisoning in sheep are constant in these cases and include (1) a period of increased copper intake in which high levels of copper are accumulated in the liver without toxic symptoms appearing; (2) an acute illness to which the animal succumbs in a matter of days. The acute stage is described as an haemolytic crisis—blood copper levels rise abruptly and there is rapid destruction of red blood cells resulting in haemoglobinaemia, severe jaundice, and haemoglobinuria. This stage may follow the copper build-up closely or may be delayed up to several months after removal of the animals from the source of excess copper.

Similar symptoms were reported in a steer by Kidder (1949) after a daily drench of 5 g. copper sulphate for 122 days, and Wiemann (1939) reported an outbreak of poisoning in cattle due to pasture contamination by dust from a copper works. *Post-mortem* examination in the latter case showed fatty degeneration of the liver but no jaundice. The outbreak was considered to be due to "chronic copper poisoning, possibly associated with arsenical poisoning in lesser degree." However, since there was no haemolytic crisis this cannot be considered as a chronic copper poisoning, even though the livers contained abnormal amounts of copper. An almost identical occurrence was reported by Bischoff and Haun (1939) and was diagnosed as a combination of chronic copper poisoning and arsenical poisoning, and in view of the absence of jaundice this seems to be a more balanced judgment.

Shand and Lewis (1957) have recorded cases of uncomplicated chronic copper poisoning in young calves fed a milk substitute ration which contained added copper. The calves were between the ages of 4 weeks and 12 weeks and *post-mortem* examination revealed generalised jaundice and analysis showed that the livers contained large amounts of copper, ranging from 1,500 p.p.m. to 2,300 p.p.m. copper on a dry matter basis.

We have recently encountered a case in a 9-month-old heifer and are not aware of chronic copper poisoning having been reported in this age group—apart from the laboratory study of Kidder (1949) mentioned above. In view of the circumstances leading to the death of this animal we felt that the case history would be of interest.

History and Symptoms

Three crossbred Shorthorn calves (2 bullocks and 1 heifer) were put out to grass at 3 months of age at the beginning of April, 1958, and given supplementary feeding in the form of a pig fattening meal fed at the rate of approximately 2 lb. per head twice daily. Towards the end of June the heifer developed a "chill" from which she recovered but afterwards was noticed to be not thriving as well as the others. Symptoms of an acute type developed on September 7th when loss of appetite, haemoglobinuria, jaundice, nasal discharge, and loss of condition were very evident. No apparent abnormality was seen in the 2 bullocks or in 3 other younger calves (3 to 5 months of age) which were fed on equal parts of a different pig meal and a calf meal. At this stage the heifer was examined by a veterinary surgeon who dispatched blood and urine samples for laboratory examination. Bovine piroplasmosis was considered a possibility although it was considered that anaemia rather than jaundice would have been expected. No leptospira or babesia were detected in the urine and blood samples respectively. Treatment for redwater was administered but the heifer died on September 13th and a *post-mortem* examination carried out 2 days later.

Post-mortem Findings

A very marked generalised icterus was present with excess bloodstained fluid in the pleural and peritoneal cavities. Urine in the bladder was almost black in colour. The liver appeared to be enlarged and on section was bright yellow. *Post-mortem* changes precluded a bacteriological examination, only a chemical examination of the liver being carried out.

Chemical Investigations

The liver of the dead calf was found to have a copper content of 1,630 p.p.m. on the dry weight basis. This was of the same order as reported in sheep dying from chronic copper poisoning, and is within the range of 1,500 to 2,300 p.p.m. Cu found by Shand and Lewis (1957) in 4- to 12-week-old calves dying from the same cause.

The 2 different varieties of pig meal being used on the farm contained 280 p.p.m. and 230 p.p.m. Cu respectively in the meal as fed (containing about 13 per cent. moisture), and the proprietary calf meal, which was fed to the younger calves, contained 22 p.p.m. Cu. The pig meals were obviously formulated to contain 250 p.p.m. added Cu according to the findings of Barber *et al.* (1955) that copper added at this level significantly increased the rate of live-weight gain of bacon pigs. The 3 older calves on this farm had been receiving about 4 lb. pig meal daily for 5 months and, assuming an average of 250 p.p.m. Cu, over this period, this is equivalent to a total of 0.15 lb. Cu or just over half a pound of copper sulphate ingested by each calf.

Blood samples taken from the 5 surviving calves at 4 days and 7 days after the heifers' deaths showed that blood copper levels were within the normal range of 0.7 to 1.7 μg. per ml. whole blood (Beck, 1941) although the levels of the 2 9-month-old animals were at the upper end of this range. Urine samples from the calves contained only traces of copper (less than 5 μg. per 100 ml.).

Discussion

In comparison with other reports of chronic copper poisoning this case followed a very lengthy period of copper supplementation at a low level. In young calves death occurred at 4 to 12 weeks of age (Shand & Lewis, 1957), and in the only recorded case in older stock death occurred after 4 months' supplementation at 5 g. copper sulphate per day. The case recorded here died after 5 months' supplementation at about 2 g. copper sulphate per day. This emphasises the fact that the ability of cattle to excrete copper is limited, though they are more tolerant than sheep.

The circumstances are perhaps unusual in that pig meal was fed continuously to calves, but on small farms where relatively large numbers of pigs are kept and only a few calves, the farmer may consider that it is not worth while to have separate meals for both species. Hitherto this has been quite a harmless procedure but, with copper sulphate being added to pig meals, it is now a source of danger to cattle and would constitute an even greater danger to sheep since this species has been shown to be much more susceptible to the chronic form of copper poisoning.

As a precautionary measure the 2 older calves, which had been receiving the same ration as the animal which died, were each given an intravenous injection of 4 g. of calcium versenate* in 200 ml. of normal saline on the grounds that it forms a soluble complex with copper and should assist in its elimination.

Acknowledgments.—We wish to thank Mr. H. N. Ferguson, M.R.C.V.S., for bringing the case to our notice, and Mr. R. Pyper for technical assistance with chemical analyses.

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* Riker Laboratories Ltd., Loughborough.

Observations on the Incidence of Infection with *Mycobacterium johnei* in Calves

BY

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SUMMARY.—The ileocaecal lymph nodes of 447 *calves were examined for the presence of* M. johnei. *Organisms resembling* M. johnei *were recovered from only* 2 *of the calves. The significance of this result is discussed.*

Introduction

IN recent years several workers have reported the presence of viable *Mycobacterium johnei* organisms in the lymph nodes of apparently healthy adult cattle. Taylor (1949, 1952) recovered the organism from the ileocaecal lymph node of 15 per cent. of graded abattoir cattle and from 6 per cent. of adult cattle on a property where clinical Johne's disease was not a problem. Since Taylor's survey, Rankin (1954) has reported incidences of 6 per cent. and 7.5 per cent. and Smith (1954) has recorded an incidence of 17 per cent. in further groups of adult cattle.

It was considered that information on the incidence in calves would further our knowledge on the incidence of infection, and this report concerns a survey made on 447 apparently healthy calves passing through Birmingham abattoir; it was from this abattoir that Rankin reported an incidence of 6 per cent. in adult cattle.

Materials and Methods

The ileocaecal lymph node was chosen for examination. Batches of approximately 40 nodes were examined singly each week; they were despatched from Birmingham in a vacuum jar and were received the following day at this laboratory. The lymph nodes of 447 calves were examined, 203 being up to 1 month of age, and 244 being from 1- to 2-month-old calves.

The method of isolation and culture was that used by Taylor (1949), *i.e.* prior treatment with oxalic acid and subsequent culture on Taylor's modification of Finlayson's medium. All cultures were incubated at 38° C. and periodically examined for 6 months before being regarded as negative. Each batch of medium used in these experiments was also used for culture of other material and was shown to support the growth of *M. johnei*.

Results

Calves up to 1 month of age. No cultures of *M. johnei* were obtained from the 203 calves.

Calves aged 1 to 2 months. One calf about 5 weeks old yielded a few recognisable colonies after 4 months' culture, and 1 calf about 7 weeks old yielded 1 small colony after 6 months. Smears made from the growth, and stained by Ziehl-Neelsen method, showed acid-fast rods having the morphological characters of mycobacteria.

A suspension of the organisms obtained from each calf failed to produce lesions in 6 weeks, or skin sensitivity to mammalian or avian tuberculin, when injected into a pair of guinea-pigs. Subcultures of the organisms, derived from 1 of the calves, grew well on Taylor's medium but no growth was observed on Dorset egg or on Dorset egg-glycerine medium.

It was considered that the characters of the organisms isolated resembled those of *M. johnei*.

Discussion

The position regarding Johne's disease, in the area contributing stock to Birmingham abattoir, has not altered materially, as far as one can ascertain, since Rankin's survey when 33 positive cultures were obtained from 552 cattle sampled. The present calf survey yielded only 2 positive cultures from 447 samples. This figure is also much lower than any reported from other surveys in adult cattle.

If one accepts that the real incidence in the calves examined is similar to that indicated by the results obtained, the most obvious reason for the very low incidence is that the majority of calves had not yet become infected; indeed, the 2 calf infections reported might have been due to congenital infection (Lawrence, 1956).

However, further studies may be needed since there are other possible reasons to account for this apparent low incidence. It is possible that the organism is present in such limited numbers that a more sensitive method of isolation is necessary. The real incidence in calves might be higher than that revealed by examination of the ileocaecal lymph nodes; since the present work commenced, Smith (1958) has reported a higher incidence of *M. johnei* in the retropharyngeal lymph nodes than in the ileocaecal lymph nodes of cattle, and suggests that the former nodes may be the portal of entry of infection. It is therefore likely that calves in an early stage of infection might possess the organism in the retropharyngeal lymph nodes but not yet in the ileocaecal nodes.

Acknowledgments.—This survey could not have been made without the kind co-operation of Mr. W. S. Davison, Deputy Chief Veterinary Officer, Birmingham, who made arrangements for the collection and classification of the specimens. I also wish to thank Dr. J. D. Rankin for his help and encouragement throughout the studies.

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Treatment of Tumours in Five Animals With Non-ionisable Derivates of Two Auxins

A Preliminary Report

BY

C. A. APFFEL

Tangier, Morocco

SUMMARY.—Auxins in ionisable forms such as acids and mineral salts were practically inactive. Non-ionisable derivates of chlorinated phenoxyacetic acid exhibited a definite cytostatic activity upon malignant tumours in mammals. The ethyl ester of 2, 4-dichlorophenoxyacetic acid, the isopropylester of 2, 4, 5-trichlorophenoxyacetic acid, and most of all the methyl ester of 2, 4, 5-trichlorophenoxyacetic acid proved to be active.

Introduction

IN 1954 an attempt was made to obtain a cytostatic effect by reducing the fermentative glycolysis of malignant tissue with sodium iodacetate. A trial on an epithelioma in a male donkey resulted in an unmistakable stimulation of the growth and thus the author's attention was drawn towards auxins, to which iodacetate is an antagonist.

In plants, at low concentrations, auxins accelerate carbohydrate consumption, activate oxidative phosphorylation, increase oxygen uptake and stimulate growth. These effects depend upon the entirety of sulfhydril groups in enzymes such as the dehydrogenases of the citric acid cycle and in coenzyme A ; they are counteracted by iodacetate which oxidises the sulfhydril groups. At higher concentrations auxins achieve carbohydrate depletion, and are powerful and very selective growth inhibitors. A most important property of auxins is that they affect the nucleic acid level in cells. They are able to provoke an increase or a decrease of DRNA and RNA in tissues depending on their concentrations (Silberberger & Skoog, 1953). Furthermore, auxins are antagonists to factors of cell division (kinines) such as kinetine (Skoog & Miller, 1957).

The author's interest in auxins increased considerably when their cytostatic activity upon crown galls, reported by Gautheret, De Ropp, Struckmeyer and others, came to his knowledge, and he endeavoured to discover if such an activity could be used for tumour inhibition in animals. The writer was encouraged in his attempt by such data as is given by Louis (1955) who found that the auxin indoleacetic acid acted upon cultures of chick embryo heart in a way similar to that upon tissues of vegetal origin, and strongly reduced the number of mitoses with increasing concentrations.

Materials and Methods

Auxins are known by farmers to be non-toxic to animals and human beings. A cow was given 6 g. daily of the ethyl ester of 2, 4-dichlorophenoxyacetic acid for 3½ months without exhibiting the slightest toxic symptom and a scientist took 0·5 g. daily of the same substance for 20 days without being disturbed. However, the toxicity of the ethyl ester of 2, 4-dichlorophenoxyacetic acid was first tested upon rabbits. 0·01 g. per kg. bodyweight per day was given by intramuscular injection. After 5 days the dose was increased to 0·02 g., and after 5 more days to 0·05 g. in an olive-oil solution. The assay was stopped after 20 days. Even at the highest dosage the substance never diminished the appetite and vivacity of the animals.

Given by mouth, auxin esters at daily doses of 0·05 g. per kg. and more soon had a laxative effect, but they never interfered with haematopoiesis and never impaired the blood formula.

Some previous assays were undertaken with indoleacetic acid and sodium 2, 4-dichlorophenoxyacetate. The former was first rendered water-soluble by the addition of equimolar amounts of piperazine. Both were given by intraveneous injections of a 1 to 2 per cent. water solution in daily doses of 0·01—0·02 g. per kg. and they were both well tolerated for 5 to 20 day treatments; however, there was neither an improvement nor an aggravation to be noticed on the malignant growths. Such a failure was not in agreement with the experiences upon tissue cultures of animal origin. Searching for possible reasons, the author became aware of Audus's work (1949); this writer had pointed out that ionisable auxins such as 2, 4-dichlorophenoxyacetic acid acted only as undissociated molecules, and that at a low *p*H there was an electrolytic dissociation accompanied by inactivation. It was realised that such an inactivation would indeed be more important at the *p*H of an interior medium in mammals (7, 3—7, 4) than at the *p*H of plant tissues (5, 5—6, 0), so it was decided to make further assays with non-ionisable derivates, chiefly esters.

The first substance to be tried was 2, 4-dichlorophenoxyacetic acid ethyl ester. Commercially available in the form of a brown liquid, this ester has an unlimited solubility in olive-oil. Even at very high concentrations (50 per cent.) the solutions are clear and resist sterilisation.

The second substance (used in Cases 2 and 3) was 2, 4, 5-trichlorophenoxyacetic acid isopropyl ester. The light brown crystals of this ester aggregate in a compact mass which melts at 80° to 90° C. On being put into cold oil the molten substance re-crystallises at once, but after re-heating (sterilising) the solution remains at least up to 15 per cent. stable.

A third substance to be tried (Cases 4 and 5) was 2, 4, 5-trichlorophenoxyacetic acid methyl ester.

Assays with this particular ester were undertaken because it had been established that auxin esters inhibit germination and budding to a greater extent as the carbon number of the alcohol radical is lower.

Results

Case I. Donkey, male, 6 years old

A tumour on the left side of the upper lip appeared 2 years earlier, and the animal was under observation from September 20th, 1955. A surgical interference would not be considered by the owner. From that time the tumour went on growing slowly and steadily. The external part had a papillar and keratic appearance, 6 cm. in diameter, bulging 4 cm. above the surrounding skin, with the upper and hindermost part the size of a prune becoming subcutaneous. No metastases could be found.

Treatment was commenced on October 15th, 1956, with intramuscular injections of 0·0125 g. per day ; this was increased to 0·02 g. on October 18th, and from October 23rd, 0·03 g. were injected daily. In one week there was already a definite recession of the tumour. On October 27th, the appearance was as follows : the keratic spikelets which ended the papillae were blunt. The tumour had receded by a quarter and appeared dry and withered ; the horny superficial layers chipped off and fell away in small pieces ; the irregular buds sloughed and separated as their base became more and more strangulated. On October 28th, local treatment was commenced by painting with a 1 per cent. solution.

On November 2nd, 1956, the last spikelets dropped off ; the growth by now was considerably reduced and had a non-ulcerated, mamillar surface. Under a slight brushing noticeable pieces of dry and dead tissue fell away. The animal appeared normal and quite fit. On November 8th, the injections were increased to 0·12 g., and on November 15th, to 0·15 g. per day. Painting with a 4 per cent. solution was continued locally. The base of the wart-like parts became more and more strangulated and a dark pigmentation appeared where the reduction was taking place ; there was a visible decrease in size in the main body of the subcutaneous part. On November 19th, an olive-sized part was taken off with a steel wire for microscopic examination. This portion appeared lifeless and no haemorrhage was noticed. The base, 3 mm. in diameter, proved to be very much reduced. The slides prepared by Dr. Ventura following the Rio-Hortega staining method, showed a fibro-epithelioma with no mitoses. They exhibited every degree of picnosis and nucleolysis. On November 21st, another wart-like part was removed. On December 1st, injections are stopped after 45 days' treatment. The sections were followed by normal cicatrisation and there was not the least proliferation to be noticed ; the tumour continued to reduce in size. During the whole of the treatment there had been no abnormal reaction. On December 5th, and 17th, the animal was brought in for an examination which revealed that since treatment had ceased the tumour had continued to recede ; of the subcutaneous part there remained only some sclerous framework ; the diameter of the base, which was 6 cm. before treatment, was now 3·3 cm. ; the bulge of 4 cm. above the surrounding skin was reduced to 1·3 cm. and the remnants were grey and lifeless. Turgid and hard before treatment, they had become rugged and flaccid. The general status was normal.

On April 30th, 1957, the animal was brought back again and what little remained of the tumour was even more dry and shrivelled than when it was last seen, and it was taken off by an electrocauter. On August 8th, and in October, 1957, all that was to be seen was a fine dark grey scar, non-infiltrated and without any proliferation. Finally, this animal was seen again on August 6th, 1958, and showed no signs of a relapse.

Case 2. *Mule,* 10 *years old*

This animal was in a bad state of nutrition and had several visible tumours. On the left side there was a suborbital mass as big as a fist, partly subcutaneous, and ulcerated. The eye-ball was covered by tumours but was intact ; protruding out of the orbit there was a pedunculated, bloody, proliferating lump. Another egg-sized growth, above the orbit, was entirely subcutaneous, regularly curved and hard. On the " caruncula lacrimalis " there was a similar but much smaller lump. A tumour on the root of the right ear was quite different ; it was 6 cm. in diameter and was similar to that on the donkey (fibro-epithelioma). A large excrescence was also present on the upper lip (12/7 cm.) ; this was similar to the one on the ear, but was without the horny spikelets and was more even. There was a nummular growth on the lower lip some 3 cm. in diameter, and some centimetres behind this was another shaped like, and about the same size as, a hazel-nut.

Treatment was begun on April 2nd, 1957, with 0·25 g. 2, 4, 5-trichlorophenoxyacetic acid isopropyl ester given intramuscularly every day. On April 4th the dose was increased to 0·30 g. per day. After a period of 10 days there was a noticeable general regression. The superficial fibro-epitheliomata had dried up ; the thick horny layer at the surface could be removed easily in some places, uncovering rather fleshy parts, and the tumours on the upper lip and ear began to show signs of pedunculation at their base. After 2 weeks this general improvement slowed down. On April 29th, the dose was increased to 0·50 g. and again, on May 7th, the dose was increased to 1.00 g. per day. The pedunculation of all the tumours continued ; some of the parts were hanging like fruit and ligatures could be affixed. On May 18th., a prune-sized lump hanging out of the orbit and a suborbital mass of equal size were severed. The increased dose of 1.00 g. was well tolerated, and the health and general condition of the animal was vastly improved. On June 5th, the daily dose had to be reduced to 0·50 g. because the substance was in short supply. The same day the whole of the tumour on the upper lip, which was by then pedunculated to an extreme, was taken off with an electrocauter. Two days later the tumours on the lower lip were treated in the same way. On June 12th

treatment was ended after 56 injections. The subcutaneous mass above the eye had dwindled by one third ; it was easily moved and had an irregular, knotty surface ; the growth beneath the orbit was dry and appeared to be inactive ; the one at the " caruncula lacrimalis " was smaller. The tumour on the right ear appeared to be dry and withered, and had receded by more than one half ; it had become choked at the base and cleft, and its colour was silver-grey. The animal was seen for the last time on June 22nd, 1957. All the wounds were cicatrised, there was no sign of activity and the general status was excellent.

Case 3. *Dog* (*Boxer*), *male*, 1½ *years old*

A diagnosis of epithelioma of the " ulcus rodens " type was confirmed by the Institut Pasteur. Since March 10th, 1957, there had been a history of a rather rapid-spreading ulceration along the upper lip, on the cleft and along the whole raphe to the gums.

Treatment started on April 15th, 1957, with daily intramuscular injections of 0·10 g. isopropyl ester of 2, 4, 5-trichlorophenoxyacetic acid. As early as April 21st there was a marked improvement, and by April 24th healing had commenced beyond doubt ; the ulceration began to close and it was nearly cicatrised by April 28th. Where tissue had been lost there was now a rosy scar, without pigmentation, which was in clear contrast to the surrounding integuments. The last injection was given on May 2nd, and the case was considered cured. The animal was seen frequently until January, 1958. The scar continued to fade and to take on its normal colour until it became no longer distinguishable. The animal was seen again on August 25th, 1958, and there was no sign of return of the ulceration.

Case 4. *Cat. Neuter male*, 4 *years old*

An epithelioma of the " ulcus rodens " type, the same as in Case 3 was diagnosed. The lesion was first noticed on January 2nd, 1958, when the cat appeared to be in good health, but had been eating less for the last 2 or 3 weeks. The ulceration on the inner face of the upper lip, over which it protruded, was 12 mm. in length, and 6 mm. in breadth.

Treatment started on January 18th, 1958, with daily intramuscular injections of 0·06 g. of the 2, 4, 5-trichlorophenoxyacetic acid methyl ester. In 2 days an improvement was noticeable, the ulceration visibly closing, and by January 28th nothing remained but a fine strip 3 mm. by 1 mm. Healing was complete by February 1st. However, injections were continued for a further 4 days. Never during the whole time of healing (and this applied also to both the last 2 cases) was there the least sign of proliferation. The appetite improved from the first injection and the cat maintained an appearance of good health throughout the treatment. The cat was seen again on August 8th, 1958, when there was a perfect cicatrisation and no relapse.

Case 5. *Cat.* 8 *years old, pregnant*

A tumour of the 1st mamma on the left side had developed over a period of about 6 months. The growth was 6·2 cm. by 4·8 cm. and 2 cm. thick and had an even surface, partly ulcerated. The wound was smeared with pus and the mass of the growth was beginning to become attached to the chest, but it was still slightly moveable. There were two lymph nodes the size of hazel-nuts between the main tumour and the axilla, but otherwise the cat was still in a fair condition. Some injections of penicillin had been given earlier because of the secondary infection.

Treatment with the methyl ester of 2, 4, 5-trichlorophenoxyacetic acid began on June 10th, 1958, 0·06 g. in a 10 per cent. olive-oil solution being injected into the muscles every day. On June 13th the ulcerated area was clean and dry and appeared to have sunk. On June 15th a pronounced nodulation began to be noticed giving a grape-like appearance, and thereafter the ulceration continued to clear, the tumour becoming more and more easily moveable. On June 25th the treatment had to be stopped, the owner refusing to bring the animal for further injections or to have the tumour removed. The growth at this time was markedly reduced in size and nodulated, and the ulcerations were dry, clean and hollowed.

On August 28th, 1958, the cat was brought back. In the meantime it had had one kitten, which is still alive. The cat's general condition was good. As for the tumour, it had not enlarged since the treatment was discontinued, but was somewhat more attached to the chest ; the lymph nodes were smaller and reduced to tiny hard knots. It was impossible for the owner to bring the animal regularly for further treatment.

Discussion

It must be pointed out that auxin preparations of technical and even analytical grades contain impurities such as polychlorophenols, in particular, 2, 4-dichlorophenol (Hansen, 1951). These contaminators are uncoupling agents in the same way as 2, 4-dinitrophenol ; they deconnect mitochondrial respiration from oxidative phosphorylation and impair the formation of ATP. They also induce the appearance of auxin oxidases and enhance the latters' activity (Galston & Dalberg, 1954 ; Jensen, 1955 ; Goldacre *et al.*, 1953). Preparations of 2, 4-dichlorophenoxyacetic acid or derivates of it also contain isomers such as 2, 6-dichlorophenoxyacetic acid. In turn, 2, 4, 5-trichlorophenoxyacetic acid preparations may contain the isomer 2, 4, 6-trichlorophenoxyacetic acid. Such isomers can inhibit or reverse the effects of active auxins. Except for the last sample of 2, 4, 5-trichlorophenoxyacetic acid methyl ester this work was carried out with insufficiently purified substances. It was very limited by the number of cases, which could not always be kept under observation for long enough ; also, it was not always possible to get the microscopic examinations required. Notwithstanding this the assays show that the remarkably selective activity of auxins could be usefully applied in cancerology. It is hoped that further work on a larger scale, in better conditions, and with some other derivates will confirm these findings.

(*Concluded at foot of col.* 1 *overleaf*)

Adjuvant Rinderpest Vaccine: Adverse Sequelae

BY

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SUMMARY.—In Kenya 24,786 cattle were vaccinated with an adjuvant rinderpest vaccine between 1953 and 1956. Many developed objectionable lesions at or near the inoculation site which led to the condemnation of an average of 4 lb. of meat per animal. The abattoir findings were confirmed at the laboratory. Adjuvant vaccine given subcutaneously always produced severe and persistent lesions, half of which were purulent. Vaccine given intramuscularly produced persistent purulent lesions in half of the vaccinated animals.

Introduction

BETWEEN 1951 and 1954 a group of guest workers from the U.S.A. developed at Kabete an adjuvant rinderpest vaccine (Maurer *et al.*, 1956). The base of formalinised rinderpest-infected bovine spleens was combined with a mixture of mineral oil and freeze-dried, heat-killed Mycobacterium organisms. As an immunising agent the vaccine was excellent. Originally the vaccine was administered subcutaneously but because of the high incidence of persistent swellings at the inoculation sites the route was changed and the vaccine was given intramuscularly. The swellings following intramuscular inoculation clinically regressed. Unfortunately, however, the improvement was more apparent than real. Examination of the vaccinated cattle at slaughter revealed a high incidence of vaccine lesions which although sterile were aesthetically objectionable and led to condemnation. The abattoir findings are herein recorded together with the experimental confirmation of their incidence.

Materials and Methods

Abbatoir findings. Vaccine was administered to 24,786 cattle between 1953 and 1956. Towards the end of 1953 sterile purulent cysts were detected during routine meat inspection. The incidence increased and was correlated with a history of previous immunisation with adjuvant rinderpest vaccine.

Experimental confirmation. Doses of 2 potency-tested batches of adjuvant rinderpest vaccine were inoculated either subcutaneously or intramuscularly into randomly-selected groups of 5 cattle which were thereafter examined clinically at monthly intervals. Between the first and sixth months after inoculation individual cattle were killed, the order of selection being determined from a table of random numbers. Particular attention was paid during the *post-mortem* examinations to the sites of inoculation. The lesions were assessed on a 5-plus basis. One-plus indicated the absence of a detectable lesion. Two-plus was a lymph gland-like swelling, 1 by 1 inch, and represented the expected normal response to the vaccine. Abnormal lesions were scored as 3- 4- and 5-plus when the swellings were 2 by 2 inches, 3 by 3 inches, and larger respectively. The persistence of the lesions was measured by the ratio of the lesion score at 7 days to the score at X days after inoculation. Thus unity indicated an unaltered lesion, whereas a ratio greater than unity revealed a regression in size. Differences between groups were tested for significance either by Student's t or the chi-square test.

Results

Abattoir Findings

Purulent lesions were found in the majority of cattle presented for slaughter within 2 years of inoculation with adjuvant rinderpest vaccine. Older lesions tended to be organised with large amounts of granulation tissue present. The site was usually in the rump of the hind quarter but, on occasion, lesions were encountered in the flank and shoulder.

Subcutaneous injections provoked diffuse purulent infiltrations with a tendency to penetrate the hide and form ulcers. The detection of deep intramuscularly-located lesions presented great difficulty because, frequently, the only indication of abnormality was a slight protrusion of the fat tissue. Most of the lesions between the strong muscles of the rump were enclosed in a capsule but purulent avenues of escape leading towards the femur were not uncommon. The size varied from that of a walnut to a child's head containing several pints of cream-coloured viscid pus. Normal viewing as performed during routine meat inspection failed to detect the smaller lesions which came to light during the cutting up of quarters in butchers' shops.

When detected the lesions were excised and, on the average, 4 lb. of flesh were removed but condemna-

* Present address: East African Veterinary Research Organisation, Muguga, Kenya.

Treatment of Tumours in Five Animals With Non-ionisable Derivates of Two Auxins—A Preliminary Report—*Concluded.*

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tion of half or even whole hind quarters was not uncommon. Prime carcases had to be down-graded and additional loss resulted from destruction of valuable hides when subcutaneous pus infiltrations were present.

Experimental Confirmation

Incidence of lesions. Lesions were found in all the vaccinated animals. Seven of the 20 cattle had abnormally large and clinically palpable lesions *ante mortem* (Table I). Differences attributable to batches of vaccine and routes of inoculation were not significant (chi-square = 0.66, $P > 0.10$). Abnormal lesions were present in 15 cattle at *post mortem*. Differences attributable to batches were not significant (chi-square = 0.00, $P > 0.95$). Differences attributable to the routes of inoculation were significant, the incidence being greatest in cattle vaccinated subcutaneously (chi-square = 4.27*, $P < 0.05$). Half the subcutaneous lesions and all the intramuscular lesions were purulent.

TABLE I

INCIDENCE OF ABNORMAL LESIONS IN CATTLE VACCINATED EXPERIMENTALLY WITH ADJUVANT RINDERPEST VACCINE

Vaccine batch	Route of inoculation	*Ante-mortem*	*Post-mortem*
1	S/C	1/5	5/5
	I/M	2/5	2/5
2	S/C	2/5	5/5
	I/M	2/5	3/5
Pooled batches	S/C	3/10	10/10
	I/M	4/10	5/10
Pooled batches	Pooled routes	7/20	15/20

Numerator = Number of cattle with abnormal lesions.
Denominator = Number of cattle vaccinated.

Persistence of lesions. The lesions in cattle vaccinated intramuscularly appeared to regress with time whereas subcutaneous lesions remained unaltered (Fig. 1). The difference between the regres-

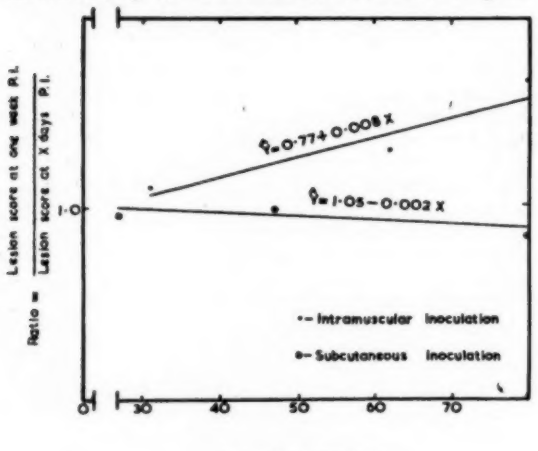

FIG. 1.—Effect of time on the size of the lesion induced by adjuvant rinderpest vaccine.

(*Concluded at foot of col. 1 overleaf*)

Clinical Note

CONGENITAL PYLORIC STENOSIS

Leslie W. White and A. T. Hose

Ilford, Essex

THERE appears to be very little reference to pyloric stenosis in the standard veterinary textbooks. Certainly we have found no information regarding surgical interference in such cases and in view of this we felt the following report would be of interest.

The subject was a 4-month-old Boxer bitch, with a history of vomiting which commenced soon after weaning and increased in frequency despite attempts at treatment with dieting and bismuth preparations. The animal was naturally very emaciated and vomiting occurred several times daily; otherwise she was a bright lively pup.

X-ray pictures were taken to eliminate the possibility of a foreign body, although this was not suspected, and a general examination was made. During palpation of the abdomen the animal suddenly extended her neck, with the head slightly raised, and pumped vomitus in an arc across the table. Apparently this projectile vomiting is peculiar to pyloric stenosis and in the absence of any evidence to the contrary this diagnosis was made.

Mysoline was administered over a period of 3 weeks as an anti-spasmodic, which proved to be an excellent alleviative treatment. The vomiting decreased to an occasional attack and the pup began to gain weight, but projectile vomiting recurred whenever the drug was discontinued.

However, by this time the animal was more robust and consequently a better surgical risk so, with the owner's consent, an exploratory laparotomy was decided upon.

The patient was anaesthetised with intravenous pentobarbitone sodium* and a mid-line incision was made into the epigastrium. The pylorus was sought and exposed and found to be considerably thickened, so it was decided to try the operation as performed on human babies for congenital hypertrophic pyloric stenosis.

Two 1-inch longitudinal incisions were made on either side of the pylorus through the serous and muscular layers, taking care to leave the mucous layer intact, and thus permitting the pylorus to expand. The part was returned without suturing and the abdomen closed.

The pup made an uneventful recovery without once being sick during convalescence and was sent home 10 days after the operation.

Nine months have now passed and our patient (recently examined) is a fine specimen with no suggestion of gastric disturbance.

*Nembutal.

A Vaccine against *Dictyocaulus viviparus*

A PRESS conference was convened at the Piccadilly Hotel, London, W.1, yesterday (Friday) morning, by Messrs. Allen & Hanburys Ltd., to announce their production of a vaccine against *Dictyocaulus viviparus*. The company's product arises from research work carried out by a team of workers from the Glasgow Veterinary School, whose experimental findings have been recorded from time to time in THE VETERINARY RECORD. At the press conference the B.V.A. was represented by the Editor of this journal.

The following note gives the background to the commercial production of the new vaccine.

Despite the fact that it has been known for many years that animals which have recovered from helminth infection are refractory to a greater or lesser extent to subsequent infection, it is only recently that this has been demonstrated experimentally. Much of the earlier work on immunity to helminths was concerned with the demonstration of antibodies or allergic skin tests with a view to using these as diagnostic tests. To-day, it is possible to immunise animals against a variety of diseases caused by viral and bacterial agents, but hitherto a practical vaccine for a disease caused by a nematode parasite has not been available.

The fundamental mechanisms of immunity to helminths do not differ from those to be expected in other infections since antibodies, antigens, and cells of the reticulo-endothelial system play a leading part in the phenomenon. Apart from the obvious advantages of such vaccines, they would also be effective in preventing the extensive damage that is frequently caused by migrating larval nematodes in sites inaccessible to anthelmintic compounds. This applies in particular to *Dictyocaulus viviparus* infection.

It is known that calves which have suffered from husk are usually resistant to re-infection, a fact which suggests that they become immune to the disease.

Workers at the Glasgow Veterinary School during the course of a comprehensive research programme on this disease demonstrated that the serum antibody level as measured by complement fixation rose when re-infection was attempted. They also showed that passive immunity could be conferred by intraperitoneal injection of large quantities of serum from recovered cases. There was no doubt then that immunity to husk depended in part at least on humoral antibodies and that on these grounds it should therefore be possible to immunise calves artificially.

Vaccination using a ground lyophilised whole worm vaccine was attempted but the results were not promising, and in any event such a vaccine could not be considered a practical possibility. At this time, however, accumulated scientific evidence suggested that the presence of living larvae or at least their metabolic products was essential for the development of an adequate immunity to re-infection. A possible answer to the problem of practical vaccination was investigated by using partially inactivated infective *Dictoycaulus* larvae; these might be expected to live long enough in the calf to produce an immune response and yet die before they produced the disease —in other words, retain their antigenicity yet lose their pathogenicity.

Partial inactivation of lungworm larvae was accomplished by exposing them to X-rays, and a level of X-irradiation was found which achieved the desired degree of inactivation. This was reported at the 1957 B.V.A. Congress at Cambridge. Extensive laboratory and field trials, already published in THE VETERINARY RECORD, have demonstrated that the vaccine enabled calves to resist a high challenge successfully. In 1958 over 8,000 calves were vaccinated in S.W. Scotland, and although the year was a bad one for husk, all the vaccinated animals withstood the field challenge, which in some areas was quite high.

The introduction of this *Dictyocaulus viviparus* vaccine represents a major advance in the prevention of the disease, since calves may now be rendered immune before grazing on infested pasture. Quite apart from the decreased mortality in calves, there will be a considerable saving in the cost of feeding, housing, and nursing. The elimination of one of the more important diseases of young calves now seems possible.

In a wider context it must be noted that this is the first successful anti-parasite vaccine to be developed; now that its laboratory and field application in one disease has been successfully demonstrated, we can, perhaps, look forward to the eradication of other and equally serious helminthic diseases in our domestic animals. Perhaps also our medical colleagues will be able to adapt these results to a practical use in controlling some of the serious parasitic diseases found in man in many parts of the world.

(*Concluded at foot of col. 1 overleaf*)

Adjuvant Rinderpest Vaccine : Adverse Sequelae—*Concluded.*

sion lines was significant ($t = 3.404^{**}$, $P < 0.01$). The clinical findings were not confirmed at *post mortem*. The mean ratios of the intramuscular and subcutaneous lesions were then 0.93 ± 0.10 and 0.75 ± 0.07 respectively. The difference was not significant ($t = 1.760$, $P > 0.05$). In other words, the lesions, independent of the route of inoculation, tended to persist and the decrease in size of the intramuscular lesions noted clinically was false.

Discussion

The high incidence of abnormal lesions detected at the abattoir in cattle vaccinated with adjuvant rinderpest vaccine was confirmed experimentally and, despite its excellent immunising properties, the vaccine has had to be withdrawn.

Acknowledgment.—This paper is published by kind permission of the Director of Veterinary Services, Kenya.

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A Study Tour of France

(Harry Steele-Bodger Memorial Award)

BY

ERIC I. WILLIAMS

St. Clears, Carms.

THIS study tour during May, 1958, had three main objects:—

To visit Dr. M. Dussardier, Station de Recherches de Physiologie Animale, Jouy-en-Josas, near Versailles, and discuss with him certain aspects of ruminant fore-stomach physiology;

To visit the veterinary colleges at Alfort and Lyon;

To meet and discuss problems of mutual interest in large-animal practice with leading French veterinary surgeons.

Visit to Jouy-en-Josas

The Station de Recherches de Physiologie Animale is a section of the Institut National de la Recherche Agronomique, under the control of the Ministry of Agriculture. The Institute has 6 main divisions: animal physiology, nutrition and breeding, milk technology, poultry, biochemistry, and acoustics physiology (dealing with insects and birds).

Among the main lines of research may be listed briefly:—

Reproduction in the male. The influence of nutrition on spermatogenesis is being studied, and recently radioactive phosphorus has been used in this study. This substance fixes nucleic acid and is discovered in the mature sperm in all species about 40 days following parenteral inoculation.

Reproduction in the female. Ovogenesis and travel in the oviducts are under observation, and transplantation of fertilised ova in both the ewe and the rabbit are extensively practised.

Wool Production. Studies include the influence of light on the ratio of wool and hair follicles in the skin.

Ruminant Fore-stomach Physiology

Dr. Dussardier and his colleagues are carrying out an extensive research on the extent of the central control of fore-stomach motility in ruminants. Their work is directed to sheep in which species they have extended the use of the technique of nerve anastomosis evolved by Hillarp (1946). In their experiments the distal end of the left phrenic nerve is sutured to the central end of the left superficial vagus nerve a short distance before the latter joins its right counterpart. (At this point the vagus consists of fibres solely for the abdomen and the abdominal end of the oesophagus.) Eight months afterwards, a thoracic "window" is prepared by resecting the ninth, tenth, and eleventh ribs in the lower thoracic region, and part of the diaphragm is sutured around the "window" on to the skin. After a lapse of one month, a permanent fistula is prepared in the anterior rumen, using a transthoracic approach. Five animals have hitherto been submitted to this technique.

The phrenico-vagal anastomosis permits the reinnervation of the diaphragm through the preganglionic fibres of the abdominal vagus, and by using an electro-myograph the contractions of the diaphragm can be registered following efferent impulses *via* the vagus. The cycle of fore-stomach motility is recorded simultaneously *via* the ruminal fistula.

This technique proves that efferent impulses are conveyed to the fore-stomach *via* the vagus during its contractions, and it has been shown that the efferent activity of this nerve is the phasic, as distinct from the tonic type. It is suggested that a similar mechanism is associated with hunger contractions in monogastric animals.

Veterinary Education

Veterinary education in France comes under the jurisdiction of the Ministry of Agriculture, and is served by three colleges, those at Alfort, Toulouse, and Lyon, the latter being the oldest in the world, having been established in 1762.

The course of study covers 4 years. Following graduation most veterinarians present an essay which qualifies the candidate for the title of docteur vétérinaire. It is interesting to note that all three colleges provide "Journées des vétérinaires," *i.e.* open days, at regular intervals, which take the form of demonstrations, etc. Most of the demonstrations are given by the staff, but practising veterinarians are sometimes invited to perform surgical operations or present papers on clinical problems. It is the custom for groups of final-year students, at Alfort, to receive clinical instruction with practising veterinary surgeons in the Paris area, usually on Saturday mornings.

Veterinary Practice in France

Large-animal practice is well developed in France though small-animal practice is not so advanced as in Britain, except in some of the large towns. The author was impressed by the practical ability of a number of veterinarians whom he visited who also

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A Vaccine against *Dictyocaulus viviparus.—Concluded.*

Great credit must be given to the team at the Glasgow Veterinary School, whose efforts to solve an essentially practical problem have opened up a completely new field in the control of helminthiasis. Credit is also due to Messrs. Allen & Hanburys Ltd., who have pioneered the commercial development of this entirely new approach to the control of animal disease. It is hoped that these joint efforts will prove of great benefit to the agricultural community not only of this country but also overseas.

seemed to be well informed in the world veterinary literature. It was refreshing to find copies of THE VETERINARY RECORD on one veterinarian's desk! French veterinary surgeons are most industrious. In one practice, the principal would attend to 6 to 8 cases before calling for the writer at his hotel at 8 a.m. in the morning!

Some information on the scale of veterinary fees in France was obtained. These vary considerably in different regions, but the following may be taken as averages. The individual fee is calculated on the basis of mileage (approximately 45 francs per km.) plus visit (500 francs) plus medicament.

Some examples of fees charged may be of interest, and for purpose of comparison the pound sterling is regarded as exchanging at 1,000 francs.

Milk fever, 2-3,000 fr.; bovine dystocia, 4,000 fr.; bovine gastrotomy, 7-10,000 fr.; bovine caesarean section, 15,000 fr.; prolapse of bovine uterus, 4,000 fr.

One veterinary surgeon quoted as follows:—

Milk fever, 4-5,000 fr.; calving, 5,000 fr.; rumenotomy, 12-15,000 fr.; caesarean section, 20,000 fr.; dehorning cattle, 1,000 fr. per head.

The most striking feature of the tour was that in each practice visited, the writer was forcibly reminded that meat inspection in France is vested in the veterinary profession. In some areas this work also entails the inspection of butchers' shops, etc.

Disease Problems

In general the main disease problems are similar to those in Britain. A considerable proportion of the daily round is devoted to cases of mastitis, calf scours, sterility, etc. Milk fever is common, but acetonaemia seems to be confined to the north. Postparturient haemoglobinuria in cattle occurs in certain areas and it is attributed to blood phosphate imbalance. Brucellosis is prevalent, and vaccination is extensively carried out. Piroplasmosis is a well-recognised condition in horses and dogs. In the north-west, the latter condition, and parasitic bronchitis, are encountered in cattle.

Tuberculosis

An attempt is being made to eradicate this condition in cattle. However, there seems to be a lack of standardisation of the methods of administering and interpreting the tuberculin test. Most of the difficulty probably arises from the use of bovine tuberculin only.

Foot-and-Mouth Disease

Foot-and-mouth disease is endemic in France but occurs in a less virulent form nowadays. Eradication by a slaughter policy is practised only in Finistère. In other regions, in the event of an outbreak, certain precautions are taken to localise the disease. In the Seine-et-Marne Department, a 2-mile infected area is declared surrounding the infected premises. This includes a standstill order on the movement of animals on the farm concerned, except for direct conveyance to a slaughterhouse, by licence. No milk may be sold and no manure may be removed from the farm yard. Dogs and poultry are kept indoors and facilities for disinfection must be provided at the farm entrance.

In most cases, the sale of milk may recommence about 2 weeks after the disappearance of mouth lesions. In certain Departments it is compulsory to vaccinate all cattle within a 2-mile area, with Government financial assistance.

During a visit to Tours, the writer was taken on a conducted tour of the foot-and-mouth laboratory, and was shown the preparation of the vaccine. For this purpose, cattle are purchased from Finistère and the procedure is as follows:—

The live animal is strapped on a table and its whole body surface is shaved and scraped. A suspension of cow-pox virus in glycerine is then spread over the whole body, and foot-and-mouth virus is inoculated into the tongue. On the fourth day the animal is slaughtered and from its skin, a paste consisting of skin cells, glycerine, and foot-and-mouth and cow-pox virus is collected into flasks to which more glycerine is added. The mixture is then placed in deep-freeze at 25° C. for a certain period.

A, O, and C types are then taken in equal quantities and the mixture is passed through a grinder several times and then mixed with distilled water in tanks when the virus is extracted from the skin cells into the water. After centrifuging, the supernatant fluid is removed and passed through a Seitz filter and then sucked into a large stainless-steel tank into which Al_2O_3 is blown from below. Formalin is then added, and after an interval of 3 days the mixture is collected into flasks and prepared for marketing.

This laboratory issued 1,800,000 doses of vaccine in 1957. Since 1954, the trivalent vaccine has been in use and the recommended dose for adult cattle is 15 c.c., inoculated subcutaneously, giving an immunity for 6 months. A disadvantage of this vaccine, from the practice point of view, is that it has to be kept continually in ice.

The writer was impressed by the efficacy of the vaccine during a visit to the Haute-Marne Department, where he encountered his first case of the disease in a group of 40 Charollais cattle. Seven of these animals had contracted foot-and-mouth disease, but the remainder, which had been vaccinated 2 months previously, remained immune.

The Eisenhut Metal Evaquator

During a visit to Versailles, the writer was given a demonstration on the use of the Eisenhut Metal Evaquator. This Swiss metal probe is widely used on the Continent for the removal of foreign bodies from the reticulum *via* the mouth. It consists of a long, flexible, hermetically-sealed tube which rotates only about its own axis, and at the far end carries a strong magnet over which is mounted a grasping device. A funnel-shaped leather collar is mounted between the magnet and the tube, which serves to protect the oesophagus during the withdrawal of the instrument. At the operative end, the probe is fitted with a tension lever from which runs a double cable inside the probe, connecting it with the magnet casing. By means of backward and forward motion

of the lever, as well as rotation of the probe about its own axis the reticulum can be systematically searched for foreign bodies.

A fasting period of 2 days in the case of green food and 2 to 3 days in the case of dry food must be observed before applying the evaquator in a suspected case of traumatic reticulitis.

Opinions on the efficiency of this evaquator vary considerably. One veterinary surgeon had used it on 300 occasions and maintained it was 90 per cent. effective, whilst others were not so impressed. One

Magnet in searching position in the stomach (position of probe when lever is pulled back, lever in horizontal position).

of these instruments has now been acquired in my own practice, though so far we have had little success with its use in 6 cases. These failures were due to:—

(a) Inability to negotiate the reticulum by inexperienced operators!

(b) In one case, the offending object was a 3-inch piece of copper telephone wire.

(c) The writer has now discovered that the magnet is in need of re-charging—having failed to withdraw a 4-inch piece of baling wire embedded to a depth of 1 inch through the reticular wall—confirmed by subsequent rumenotomy and simultaneous passage of the probe. A further report on the use of this instrument will be published in due course. The cost, incidentally, is 500 Swiss francs (£48) plus 20 per cent. import duty.

General Remarks

France is self-supporting in foodstuffs and there seems to be a general shortage of cattle, which command comparatively high prices. The main breds are Friesians, Normandy, Charollais, Tache de l'est, Swiss, Abondance, and Maine Anjou. The British auction market system is almost unknown in France, and nearly all buying and selling is done by cattle dealers.

In view of the recent interest shown by British farming circles in the Charollais breed, the writer took a particular note of their conformation, etc. This hardy, purely beef, colour marking breed is characterised by rapid live-weight gain with the meat very well marbled and a minimum of internal fat. These qualities are well transmitted during cross breeding. It is interesting to note that Charollais meat commands a higher price on the Paris markets than other meat. The calves are reared up to the age of 2 months, and on most farms the diet is solely of milk—the calves being muzzled between meals.

An opportunity was taken to visit an agricultural show in the Seine-et-Marne Department. This was a local event but even so the writer was not impressed by the standard attained. Poor udder conformation was a striking feature of French cattle in general, as compared with British cattle.

It was in this Department that I encountered a system known as the "white lamb" production system. Here the lambs are born and reared indoors. The ewes are allowed outdoors in the daytime and return to their lambs in large covered yards overnight. The lambs are slaughtered at about 100 days giving an average weight of 35 kg.

La Société Vétérinaire Pratique de France

On May 14th I attended a meeting of the above society, which meets in Paris every second Wednesday in each month, except August and September. Each new member is expected to present an original clinical observation within 3 months of his election. The society issues a monthly bulletin. Since my visit I have had the privilege of being elected to membership of the society.

There were 25 members present at the meeting I attended, which was a special session on tuberculin testing in cattle, and enteritis in pigs.

Acknowledgments.—I wish to record my sincere thanks to the following: The Harry Steele-Bodger Memorial Prize Committee, for making this highly enjoyable and instructive tour of study possible; my colleagues in the South Wales Division, B.V.A., for the nomination for the Award; Mr. Terence Wills, British Embassy, Paris, for his assistance and advice; my senior partner, Mr. A. T. Morgan, for his kind co-operation; numerous French veterinary surgeons and their wives for wonderful hospitality; the President and the Secretary, Société Vétérinaire Pratique de France, for their interest and warm reception; Dr. M. Dussardier, Station de Physiologie Animale, de l'I.N.R.A., Jouy-en-Josas, for a most interesting visit to his department, and Professors Florio, Bordet, Lagneau, and Charton, for their kind reception.

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THE ROYAL COLLEGE OF VETERINARY SURGEONS

The Executive Committee of the European Commission for the control of Foot-and-Mouth Disease are holding a three-day meeting at the Royal College of Veterinary Surgeons on February 24th, 25th, and 26th.

The name of Mr. Patrick Thomas Martin Allison, P.O. Box 95, Tauranga, New Zealand, was restored to the Register of Veterinary Surgeons under the provisions of Section 17 of the Veterinary Surgeons Act, 1948.

News and Comment

IMMUNISATION OF MINK

The B.V.A. wishes to make contact with members who have experience of immunising mink against distemper. Would members who do this work please notify the General Secretary at 7, Mansfield Street, London, W.1.

GLASGOW VETERINARY SCHOOL CONTRIBUTION TO PUBLIC HEALTH

An interesting exercise in collaboration between veterinary and medical workers has been continuing for some time in Glasgow, where members of the staff of the Glasgow School are working with the medical staff of the Mass Radiography Centre and a local hospital on a scheme to pick out domestic pets which are carriers or reservoirs of infection of human tuberculosis, and prevent others becoming so. Following intradermal B.C.G. as a method of diagnosis by doctors in human beings and its successful pioneer use in monkeys by Mr. Oliver Jones at London Zoo, and by Dr. V. M. Hawthorne at Glasgow Zoo, it was decided to apply the method to dogs and cats. In households where there is a human tuberculous patient veterinary workers are arranging to give animals in the household such injections with a view to diagnosing tuberculosis. If the injection does not indicate infection it may create immunity to the disease. In five recent cases four out of five confirmed tuberculous dogs reacted.

We hope to publish more about this work later on, and readers may like to refer to an abstract from the article in the *British Medical Journal* which we published on September 28th, 1957.

A NEW FILM ON FOOT-ROT CONTROL

The Universities Federation for Animal Welfare has recently released a new film entitled "The Control of Foot-rot in Sheep." This film is in 16-mm. sound and in colour, and has a running time of 12 minutes. It illustrates the method of eradication which is described in various leaflets which the Federation publishes, and may be borrowed, free of charge. Borrowers are asked to pay the postage in both directions.

THE ASSOCIATION OF VETERINARY TEACHERS AND RESEARCH WORKERS

In our Notices column this week is published the Agenda of the 21st Ordinary General Meeting of this Association, and as will be seen most of the time will be taken up, on Thursday, April 2nd, and Friday, April 3rd, in the delivery, and subsequent discussion upon, a wide range of Papers. There would seem to be something for almost every research worker in this copious programme, and its organisers hope for a large and representative attendance. Those who organise conferences on this scale —for this ordinary general meeting seems to be, in the main, a scientific conference—are rendering a service to the entire profession, and their colleagues, it may be suggested, are under a moral obligation to attend and to take an active part in the proceedings. It is hoped that both the organisers and the readers of Papers will be rewarded by large and interested audiences.

THE SHARE-JONES LECTURES

The second of these lectures will be delivered by Sir William Slater, F.R.S., in the Powis Hall, University College of North Wales, Bangor, on February 23rd, at 8.15 p.m. The title will be Animal Husbandry, the Present and the Future, Part 2.

UNIVERSITY NEWS

Liverpool

At the meeting of the Council of the University of Liverpool held on February 10th, 1959, Mr. Duncan Allan, M.R.C.V.S., was appointed lecturer in applied veterinary pathology. Mr. Allen will take up his appointment on April 1st, 1959.

IN PARLIAMENT

Meat Research Centre

MR. WILLEY (February 12th) asked the Minister of Agriculture, Fisheries and Food whether he will make a statement about the establishment of a Meat Research Institute.

MR. JOHN HARE: The proposal that a Meat Research Centre should be set up in this country was strongly recommended by the Technical Advisory Committee on Meat Research. The proposal was investigated in detail by Dr. J. R. Vickery, an Australian expert from the Commonwealth Scientific and Industrial Research Organisation, whose services were generously lent to us by the Australian Government and his report is now being considered by the Departments concerned. My colleagues and I think that this would be a very desirable project, but until the various financial and other considerations have been settled I cannot say when it will be possible to establish a Meat Research Centre.

Farm Building Research Committee

MR. WILLEY asked the Minister of Agriculture, Fisheries and Food, as representing the Lord President of the Council, what progress the Farm Buildings Research Committee has made; and when it will make recommendations.

MR. JOHN HARE: As I explained in the reply I gave to the hon. Member on November 20th, 1958, the Committee is engaged on its essential preliminary tasks. That of collating all the relevant information of research carried out both in this country and abroad is almost complete. The survey of farm buildings is proceeding according to plan and the whole country should be covered in two years.

AREA ERADICATION PLAN FOR TUBERCULOSIS

There will be four new tuberculosis eradication areas in England and Wales, and one in Scotland as from March 1st, 1959.

The areas concerned, in which free tuberculin

tests have been provided since March 1st, 1957, are:—

(a) Bedfordshire, Buckinghamshire (part), Cambridge (excluding Isle of Ely), Essex, Gloucestershire, Herefordshire, Hertfordshire, London, Middlesex, Norfolk, Northamptonshire (part), Shropshire, Suffolk, Warwickshire (part) Worcestershire, and Oxfordshire (part).
(b) Cornwall and West Devon.
(c) Parts of Durham and of the North and West Ridings of Yorkshire.
(d) Flintshire, Monmouthshire, Denbighshire (part), and Glamorgan (part).
(e) Aberdeenshire, Angus, Banffshire (part), and Kincardineshire.

AMENITIES FOR VETERINARY SURGEONS AT SHOWS

The following is a copy of a letter which is being sent out on the instructions of the Shows Regulation Committee to the Secretaries of all Championship, Open, and Limited Shows:—

"At a recent meeting the Shows Regulation Committee reviewed the questions of veterinary examination and the amenities provided for honorary veterinary surgeons at Championship, Open, and Limited Shows. I am, therefore, instructed to draw your attention to the following points which are overlooked at some shows:—

1. Kennel Club Show Regulation 16 states that the Show Committee personally or by their authorised manager of a show shall provide a suitable place in which dogs suspected of contagious or infectious disease can be properly isolated from the rest of the Show.

   At benched Shows a section of benching should be erected in the proximity of but not out of sight of the veterinary inspection point, so that dogs which are rejected or put back for further examination can be placed there under the supervision of the veterinary steward.
2. A separate veterinary inspection bench or ramp should be provided for each veterinary surgeon officiating.
3. Kennel Club Show Regulation 3 requires that bowls containing disinfectant and soap and water shall be provided at all entrances for dogs. A towel should also be provided with each bowl and it is suggested that the bottle of disinfectant should be left with the bowl so that the veterinary surgeon may add this to the water, if he wishes.
4. Kennel Club Show Regulation 3 also requires that a steward shall be appointed to assist each veterinary surgeon who is officiating.
5. The veterinary surgeons should always be provided with a room or a tent in the case of an open-air show. It is essential that there should be a place in which veterinary surgeons can safely leave their cases of drugs and instruments and also where they can examine dogs brought to them during the Show. A responsible person should always be left on duty in this place so that he may summon a veterinary surgeon with the least possible delay when the occasion arises.
6. Every Show should also have a book of veterinary certificates which when signed by one of the official veterinary surgeons will permit an exhibit to be removed from the Show immediately.

The Committee fully appreciates that some Shows already make a point of providing good accommodation for veterinary surgeons, but from reports which have been received it is obvious that there is room for improvement in many cases."

(Reprinted from *The Kennel Gazette* by kind permission of the Kennel Club.)

PERSONAL

Births

BESWICK.—On February 9th, 1959, at 77 Norwich Road, Fakenham, Norfolk, to Hazel, wife of Walter Beswick, B.V.M.S., M.R.C.V.S., a son.

GRIPPER.—On February 10th, 1959, to Anne, wife of J. N. Gripper, B.SC., M.R.C.V.S., "The Hurdles," Churchill Road, Chipping Norton, a son, Robert William, brother for David and Peter.

OLDHAM.—On February 13th, 1959, at Hedon Road Maternity Home, Hull, E. Yorks, to Monique (*née* Astorri) and John Oldham, a daughter, Caroline Margaret, a sister for Patricia and Kathleen.

STRANG.—To Anne (Walker) and Robert D. Strang, on December 13th, 1958, at Braintree, a son, Robert James Sterland, brother for Susan.

Marriage

MCLACHLAN—WILSON.—On February 7th, 1959, at St. Andrew's Church, Milngavie, Hugh K. McLachlan, B.V.M.S., M.R.C.V.S., of "Dundryan," Leswalt High Road, Stranraer, to Jeanette Wilson, Holy Cross, Wallsend, Northumberland.

B.V.A. COMMITTEE AND COUNCIL MEETINGS IN EDINBURGH

Wednesday, April 8th, 1959—at The Royal (Dick) School of Veterinary Studies

10.00 a.m. Farm Livestock Committee.
11.30 a.m. Parliamentary and Public Relations Committee.
2.15 p.m. Small Animals Committee.
5.00 p.m. Finance Sub-committee.

Thursday, April 9th, 1959—at The Royal (Dick) School of Veterinary Studies

10.00 a.m. Home Appointments Committee.
11.30 a.m. Veterinary State Medicine Committee.
2.15 p.m. General Purposes and Finance Committee.

Friday, April 10th, 1959—at The Royal (Dick) School of Veterinary Studies

10.00 a.m. Council Meeting.

COMING EVENTS

February

25th (Wed.). Meeting of the Southern Counties Veterinary Society at the Royal Hotel, Winchester, 7.45 p.m.

Meeting of the B.S.A.V.A. Metropolitan Region at the Royal Society of Medicine, 1 Wimpole Street, London, W.1, 7 p.m.

97th Annual General Meeting of the Lancashire Veterinary Association at the Veterinary Hospital, University of Liverpool, 2.30 p.m.

Ordinary General Meeting of the Sussex Veterinary Society in the Old Ship Hotel, Brighton, 2.30 p.m.

26th (Thurs.). Annual Ball of Glasgow University Veterinary Association at the Càdoro Restaurant.

Meeting of the Ayrshire Veterinary Association in the Ailsa Lounge, Ayr Station Hotel, 2.30 p.m.

27th (Fri.). Annual Ball of the Liverpool University Veterinary Society in the Students Union.

Annual General Meeting of the Association of Veterinary Teachers and Research Workers at the Royal Veterinary College, Camden Town, London, N.W.1, 2.30 p.m.

March

3rd (Tues.). Dance of the Ladies Guild, South East Midlands Division, V.V.B.F., at the Solarium Restaurant, Overstone, Northampton, 9.30 p.m.

4th (Wed.). Annual General Meeting of the South Wales Division at the Dolwas Restaurant and 6 Guildhall Square, Carmarthen, 2 p.m.

Annual General Meeting of the A.V.T. & R.W.'s (Northern Region) at the Veterinary Hospital, University of Liverpool, 2 p.m.

Spring Meeting of the Society of Women Veterinary Surgeons at the North of England Zoological Society Gardens, Upton-by-Chester, at 1 p.m.

5th (Thurs.). Spring Meeting of the Dumfries and Galloway Division in the Gretna Hall Hotel, Gretna, 2.15 p.m.

General Meeting of the Central Veterinary Society at the Royal Veterinary College, 6 p.m.

10th (Tues.). Annual General Meeting of the Eastern Counties Veterinary Society at the Bell Hotel, Norwich.

11th (Wed.). A meeting of the North Wales Division will be held at the Gwydir Hotel, Bettws-y-Coed at 2 p.m.

12th (Thurs.). Annual General Meeting of the Western Counties Veterinary Association at the Rougemont Hotel, Exeter, at 2 p.m.

18th (Wed.). Annual General Meeting of the Scottish Metropolitan Division in the Royal (Dick) School of Veterinary Studies, 2.45 p.m.

19th (Thurs.). General Meeting of the Society of Practising Veterinary Surgeons at the Grand Hotel, Peterborough, at 2.30 p.m.

20th, 21st and 22nd (Fri., Sat. and Sun.). Conference of the British Small Animal Veterinary Association in London.

25th (Wed.). Spring Meeting of the Lincolnshire and District Division at Eastgate Court Hotel, Lincoln, at 2.15 p.m.

April

1st (Wed.). Meeting of the R.A.V.C. Division at Glaxo Laboratories Ltd., Greenford, Middlesex, at 11 a.m.

2nd and 3rd (Thurs. and Fri.). The 21st Ordinary General Meeting of the A.V.T. and R.W's. will be held at the Gleneagles Hotel, Scotland, at 10 a.m.

8th, 9th and 10th (Wed., Thurs., and Fri.). B.V.A. Committee and Council Meetings in Edinburgh.

August

30th to 5th September. 77th Annual Congress of the British Veterinary Association in Folkestone. (Official opening Monday, August 31st.)

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Devon. Foxhole School Farm, Staverton, Totnes (Feb. 11).

Fowl Pest

Dorset. Manor Farm, Holnest Park, Sherbourne (Feb. 10).

Essex. Greenways, Balls Chase, Halstead; Witham Poultry Producers, Spring Lodge Farm, Witham (Feb. 10); Peasland Road Farm, Saffron Walden (Feb. 11); 1, Blamsters Crescent, Halstead; Tessmoorlands, Frenches Green, Felstead. Dunmow; Maplestead Hall, Halstead; Oak Lea, Wickham St. Pauls, Halstead (Feb. 12).

Norfolk. Fair View Farm, Written, King's Lynn (Feb. 10); Clint Green Farm, Clint Green, Yaxham, Dereham; Clint Green Cottage, Yaxham, Dereham; Old Hall Farm, Mattishall, Dereham (Feb. 11); Sadd, Dereham Road, Whinbergh, East Dereham (Feb. 12).

Warwicks. Armscote Manor, Armscote, Stratford on Avon (Feb. 11).

Suffolk. Gate Lodge, Santon, Downham, Brandon (Feb. 12).

Swine Fever

Ches. Crabtree Green Farm, Oakmere, Northwich (Feb. 12).

Derby. 106, Macclesfield Old Road, Buxton (Feb. 11).

Devon. Haymans Farm, Broad Clyst, Exeter (Feb. 11).

Sussex. Rogers Farm, Wivelsfield, Haywards Heath (Feb. 11); Westup Farm, Balcombe, Haywards Heath (Feb. 12).

Essex. Heath Cottage, Old Heath Road, Southminster (Feb. 10); Uplands, Bird Lane, Upminster Common, Upminster (Feb. 11).

Glouc. Leyland Court Farm, Winterbourne, Bristol (Feb. 10).

Hertford. Shirley, Trinity Lane, Waltham Cross (Feb. 12).

Leicester. Welby Farms, Welby Grange, Melton Mowbray (Feb. 11); Blackberry Lane Farm, Ibstock, Leicester (Feb. 12).

Norfolk. Seven Acres, Hempstead Road, Holt (Feb. 12).

Nottingham. Home Farm, Colston, Bassett (Feb. 10).

Somerset. Failand Farm, Failand, Bristol (Feb. 11).

Wilts. Church Farm, Urchfont, Devizes (Feb. 10).

Yorks. 876, Halifax Road, Hightown, Cleckheaton (Feb. 12).

Current Literature

ABSTRACTS

Leptospira ballum in Small Rodents in Scotland. BROOM, J. C., & COGHLAN, JOYCE D. (1958). LANCET. November 15th. 1041-2.

Until recently the only leptospiral serotypes isolated and identified in Great Britain have been *Leptospira icterohaemorrhagiae* and *Lepto. canicola*. No serological evidence of human infection with other serotypes has so far been found in Britain; but Michna (1958) reported finding agglutinins for *Lepto. pomona* in a high proportion of sera from pigs in Scotland.

The writers of the present communication examined small rodents from the estate of the Edinburgh Centre of Rural Economy, from two other estates near Edinburgh, from two Edinburgh piggeries and from the meat market. The rodents examined were 3 species of wild mice, wood mice, field voles, bank voles and house mice. Sera of 8 of the rodents had agglutination titres of 1/30 or more. Rat serum agglutinated *Lepto. icterohaemorrhagiae;* the positive mouse sera reacted with *Lepto. sejroe*, and one serum also agglutinated *bataviae* and another *grippo-typhosa*. None of the sera agglutinated any of the other sero types.

Kidney culture proved the rat strain to be *Lepto. icterohaemorrhagiae*. Strains from 2 wood mice, one field vole and one bank vole were identified as *Lepto. ballum*. This serotype was first identified in Denmark in 1944 and has been found in various species of rodents including laboratory mice. Sporadic cases of infection occur in persons handling infected mice but quite extensive outbreaks of leptospirosis due to *Lepto. ballum* have been reported among rice-field workers. No human cases have yet come to light in Great Britain. G. F. B.

Fibrosarcoma of the Urinary Bladder in the Dog. SCHILLER, A. G., MAKSIC, D., BEAMER, P. D., ALBRECHT, A. D. (1958). *J. Amer. Vet. Med. Assoc.* **133.** 12. 594-8.

This condition, which is generally regarded as fairly common in human medicine but comparatively rare in the dog, is described in a Bassett hound of 18 months. As a result of exploratory laparotomy it was found that there was a neoplastic involvement of the major portion of the bladder sphincter and a portion of the urethra. Consequently a uterorectal anastomosis seemed to offer the only chance for survival for the animal.

This operation, which proved successful, is described in considerable detail by the authors. Unfortunately, 9 months later, a large mass was able to be palpated in the region of the stump of the urethra. A second exploratory laparotomy was about to be performed, but the patient died before anaesthesia could be completed. *Post-mortem* examination revealed a large neoplastic growth originating from the urethral stump. This proved histologically to be a fibrosarcoma, as did the original growth. Liver metastases presented a similar histological appearance. J. S. J. L.

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

The Meat (Staining and Sterilisation) Regulations, 1959

Sir,—It may be of interest to your readers to point out that the above Regulations merely re-introduce the compulsory staining of meat, considered unfit for human consumption, which was in force under the Defence ordinances during the period of restriction consequent upon the late war and which has been an accepted practice in many abattoirs—both before and after its legal imposition.

In addition, the Regulations will in future apply to the country as a whole the obligation to cook all such meat sold for animal feeding purposes except that supplied direct to zoological gardens, menageries, and mink farms. Such a requirement has, however, been in force for many years in various parts of the country where local authorities have obtained the necessary Parliamentary authority through local Acts. The City of Birmingham was the first local authority to obtain such powers and is, as far as the writer is aware, the only authority to have no provision in its Act for the supply of raw meat to zoological gardens, etc. It would appear that there are either no zoological gardens, menageries, or mink farms in Birmingham or, if they exist within that City's boundaries, the animals therein must subsist on a diet of cooked "rejected" meat or be fed on meat which is considered fit for human food or some alternative flesh—such as whale meat or fish.

Prior to the First World War, the "cat's meat man" was a familiar sight in the London street with his wicker basket of meat carried over his arm. He, or she, sold only cooked meat—almost invariably horse flesh—which was sliced and placed on wooden skewers and sold for ½d. or 1d. Warehouse and factory cats regularly received their Sunday and public holiday dinners *via* the letter box.

I cannot believe that the list of consequences drawn up by Mr. Dalton will eventuate. Obviously it costs something to cook meat, and during cooking meat loses weight; hence, some adjustment in price would not appear to be unreasonable.

Gravy, however, will become a by-product of the knackery, and your readers should, presumably, have no great difficulty in arranging for regular supplies of the desirable gallonage!

Yours faithfully,

H. E. BYWATER.

Essex House,
High Street,
Stratford, E.15.
February 17th, 1959.

Mouth Ulceration in a Spaniel

Sir,—I have recently had under my care a Golden Cocker Spaniel dog about 2 years old suffering from ulceration of the inside of the cheeks. It may sound a contradiction to say that the general appearance of the mouth was healthy, but by that I mean this was not a case of a dog with badly tartared teeth or a disease condition leading to a foul mouth. In view of the fact that a very similar case in the past was kept under control—though not completely cured in this way—I tried large doses of riboflavine in conjunction with antibiotics and local treatment.

At first I thought I had achieved something as the excessive salivation was reduced and the ulcerated areas looked less inflamed; but the improvement was not maintained. Local treatment became all but impossible as the dog came to resent handling of the mouth. Recently the condition has spread to involve the edges of the tongue and the edges of the gums both inside and outside the teeth.

One interesting point for which I cannot account, and which may have no bearing, is that both this dog and one other with a very similar mouth show wastage of the temporal muscles, although in normal general health.

I cannot claim to have achieved a complete cure in the past with the use of riboflavine, but it definitely appeared to keep the condition under control. When I tried to reduce dosage below 10 mg. per day salivation increased and the ulcerated areas became more inflamed, although bigger doses did not appear to make any greater improvement. I should be interested to hear whether any of your readers have met with a similar condition, and if so, what treatment they found most effective.

Yours faithfully,
E. R. PARKER.

Rosevean,
Penzance.

February 14th, 1959.

Ladies' Programme for the B.S.A.V.A. Congress

Sir,—This is a letter to the unpaid, unqualified veterinary assistant who cleans the surgery, hacks at the typewriter, holds the animals and the children, and tries in vain to keep the meals hot by the hour; in short the veterinarian's wife.

We should like to suggest on behalf of the ladies' section of the B.S.A.V.A. Sub-committee that the wives are not left at home, but join their husbands at the Congress in March. We would very much like to meet and get to know them.

Whilst our husbands are engaged in more serious business, we have arranged our own social programme with several interesting items, such as a cosmetics demonstration and talk, fashion show, and a matinée at the London Casino to see "Cinerama." We also have a dinner and dance on Saturday, March 21st. Programmes and tickets are obtainable from Mr. Michael Young, 43, The Mall, Ealing, not later than March 1st.

We hope the wives, after reading this letter, will say "let's go" instead of "you go, dear."

Yours faithfully,
HAZEL A. PHILLIPS,
Chairman of the Ladies' Sub-committee.

84, Mulgrave Road,
Sutton,
Surrey.

February 17th, 1959.

Salaries in the Veterinary College of Ireland

Sir,—May I draw your attention to the reason why my Association does not approve of the salaries offered for the posts in the Veterinary College of Ireland as advertised in THE VETERINARY RECORD of January 31st?

Your readers may not be aware that the Civil Service post of Veterinary Lecturer in Ireland is the equivalent of a Senior Lecturer in a British University veterinary school, and the post of Assistant Lecturer here would correspond to a Lecturer in Britain.

It is the opinion of my Association that the salary range stated would not attract suitable candidates and that the salaries offered should be comparable with those pertaining to similar posts in Britain.

Yours faithfully,
B. L. MAGEE,
President.

The Veterinary Medical Association of Ireland,
Dunboyne,
Co. Meath.

February 3rd, 1959.

The R.C.V.S. and the B.V.A.

Sir,—Once in a while a suggestion by a member is adopted by the B.V.A. I should like to suggest that an invitation be extended to Mr. J. N. Simpson-White to visit the United Kingdom. During 1958 he has certainly kept THE VETERINARY RECORD alive with his criticisms, and it would appear that his 1959 New Year resolution is to keep up his good work: but whilst gaining valuable experience visiting many countries I am afraid he seems rather to have left himself out of touch with conditions in the United Kingdom.

No doubt the status of veterinary surgeons is high in Tanganyika, Kenya, and Uganda, thanks to the R.C.V.S. and the B.V.A. With regard to the U.S.A. and Canada I have some doubts (bearing in mind the letter from a Canadian veterinarian in THE VETERINARY RECORD of December 13th, 1958).

The swine fever subject is self explanatory to anyone actively engaged in an official capacity or as a private practitioner on diagnosis and control. However, perhaps a simple geographical reminder may enlighten those with no such experience, and since Canada has been Mr. Simpson-White's favoured example I would like to quote: The Dominion of Canada is 3,845,777 sq. miles in area. The estimated pig population is close to 16,000,000. The United Kingdom, including Ireland, is 94,279 sq. miles in area, and its estimated pig population is over

5,000,000. To save space I am leaving out calculations of pigs per sq. mile.

Perhaps, not intentionally, I have to defend the Argentinians whom Mr. Simpson-White constantly accuses of supplying us with foot-and-mouth disease. It might come as a great surprise to compare the figures for the past 5 years of how many outbreaks of foot and mouth in the United Kingdom originated from imported Argentine meat, and how many from the Continent. Whether those figures are available to the public I do not know; but whilst we can do something about our imports we cannot change our geographical position. Incidentally, the 1951-2 outbreak in Canada was said to be imported from Germany.

I wholeheartedly agree that meat inspection should, and I believe will, come under veterinary control. For many reasons the transitional period is taking rather a long time, but this does not mean that we need adopt the North American system. Should we not adopt modern meat inspection from the place where it originated—*i.e.* Continental Europe? Without going into history, it is said that it was Napoleon I who, in 1807, appreciated the value of public abattoirs and initiated the erection of one in Paris. One cannot deny that many abattoirs in the United Kingdom are outdated, unhygienic, etc.; but whilst the North Americans were constantly improving theirs, and enjoying a boom in the meat industry, our abattoirs, such as they were, were being destroyed by enemy action.

Whatever one's opinion is about our profession, our agriculture, and our meat inspection, one cannot suppress certain facts; for example that at the recent Perth Sales, 25,000 guineas ($71,250) was paid by an American cattleman for an Aberdeen Angus bull.

Yours faithfully,
J. R. MITCHELL.

Suite 5,
Shannon Court,
6024, 118 Avenue,
Edmonton,
Alberta,
Canada.
February 8th, 1959.

Treatment for Ear Conditions

Sir,—I read with interest Mr. Jordan's account of his experiences with "Ceruvet." By all accounts it seems to be very similar to a product known as "Otodex,"* which I have been using with immense success for the last 5 years. The difference in formula appears to be that paradichloro-benzene in Ceruvet is replaced by a flavine in Otodex. Mr. Jordan found Ceruvet contra-indicated in ulcerated otitis; Otodex has proved in most of such cases highly beneficial. Since using this product I have entirely given up attempting to clean up affected meati with cotton wool on wool-holders as, without fail, Otodex has loosened all debris and wax and permitted it to be shaken out.

This action is due no doubt to the penetrating and non-evaporating property of the vehicle.

If spilt on the table, it never dries up, even after weeks. Dogs and cats greatly resent having probes introduced into their ears; it often causes bleeding and pain, and concentrates the animal's attention to its ears, with a renewal of self-inflicted damage.

Mr. Jordan cites several animals as having resented the treatment. This may be due to the fact that the preparation was applied cold. I have usually kept Otodex in a warm room, and have not experienced the same disadvantage.

Yours faithfully,
H. KIRK.

28, Park Hill,
Ealing, W.5.
February 14th, 1959.

* Strenol Products Ltd.

ADVERTISER'S ANNOUNCEMENT

ALLEN & HANBURYS LTD. announce that Lungworm (Oral) Vaccine can be obtained under the name DICTOL from them, and will be available to the veterinary profession only.

The vaccine can be used on bovine animals of any age over two months. Two doses are necessary, with an interval of six weeks between doses.

Lungworm (Oral) Vaccine has a short life and cannot, therefore, be ordered for stock.

Orders for supplies of vaccine should state the number of animals to be immunised.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th Jan., 1959		8	—	—	33	—	55
Corresponding period in	1958	7	—	15	75	—	48
	1957	15	—	9	58	—	30
	1956	17	—	—	73	—	30

TUBERCULOSIS (ATTESTED HERDS) SCHEMES

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at 31st December, 1958, was as follows :—

ENGLAND	WALES	SCOTLAND	TOTAL (GREAT BRITAIN)
128,091	38,093	43,754	209,938

TUBERCULOSIS ORDER OF 1938

The number of bovine animals slaughtered under the Tuberculosis Order of 1938 during the period 1st October to 31st December, 1958, was 61.